PALM Intranet

Application Number Submit

IDS Flag Clearance for Application 10823816

IDS Information

Content	Mailroom Date	Entry Number	IDS Review	Last Modified	Reviewer
M844	2004-08-19	17	Y ☑	2007-02-15 15:23:32.0	BShrivastav
M844	2005-12-22	13	Y ☑	2007-02-15 15:23:37.0	BShrivastav

Update

Refine Search

Search Results -

Term	Documents
COMPUTER	1864122
COMPUTERS	412808
READABLE	369484
READABLES	10
MEDIUM	2429090
MEDIUMS	59743
MEDIA	790296
MEDIAS	2456
(30 AND (READABLE NEAR COMPUTER NEAR MEDIUM)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	23
(L30 AND (COMPUTER NEAR READABLE NEAR MEDIUM)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	23

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L36

Refine Search

Recall Text Clear Interrupt

Search History

DATE: Thursday, February 15, 2007 Purge Queries Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ		
L36	L30 and (computer near readable near medium)	23	L36

L35	L30 and (computer near medium)	20	L35
L34	L33 and (computer near medium)	10	L34
L33	L32 and L27	74	L33
L32	(324/300 |324/301 |324/302 |324/303 |324/304 |324/305 |324/306 |324/307 |324/308 |324/309 |324/310 |324/311 |324/312 |324/313 |324/314 |324/315 |324/316 |324/317 |324/318 |324/319 |324/320 |324/321 |324/322 or 600/410 |600/411 |600/412 |600/413 |600/414 |600/415 |600/416 |600/417 |600/418 |600/419 |600/420 |600/421 |600/422 |600/423 |600/424 |600/425 |600/426 |600/427 |600/428 |600/429 |600/430 |600/431 |600/432 |600/433 |600/434 |600/435 |600/436 |600/437 |600/438 |600/439 |600/440 |600/441 |600/442 |600/443 |600/444 |600/445).ccls.	20544	L32
L31	L30 and L28	4	L31
L30	L26 and L27	164	L30
L29	L28 and ((intra-subject) or (inter-subject))	2	L29
L28	((first adj value) or (second adj value)) and variation	21307	L28
L27	(Diffusion adj Tensor)	182	L27
L26	(magnetic adj resonance) or MRi or NMR	245754	L26
L25	2003013659.pn.	4	L25
L24	2003013659	4	L24
L23	10055256	7	L23
L22	6996261	5	L22
L21	6614226	3	L21
L20	5539310	34	L20
L19	5539310.pn.	2	L19
L18	L12 and (computer near readable near medium)	23	L18
L17	L12 and (computer near medium)	20	L17
L16	L15 and (computer near medium)	10	L16
L15	L14 and L9	74	L15
L14	(324/300-322 or 600/410-445).ccls.	20544	L14
L13	L12 and L10	4	L13
L12	L8 and L9	164	L12
L11	L10 and ((intra-subject) or (inter-subject))	2	L11
L10	((first adj value) or (second adj value)) and variation	21307	L10
L9	(Diffusion adj Tensor)	182	L9
L8	(magnetic adj resonance) or MRi or NMR	245754	L8
L7	2003013659.pn.	4	L7
L6	2003013659	4	L6
L5	10055256	7	L5
L4	6996261	5	L4
L3	6614226	3	L3
L2	5539310	34	L2
L1	5539310.pn.	2	L1

END OF SEARCH HISTORY

File 155] **MEDLINE(R)** 1950-2007/Feb 13

**File 155: MEDLINE has resumed updating with UD20061209. Please see HELP NEWS 154 for details.*

[File 2] **INSPEC** 1898-2007/Feb W1

[File 5] **Biosis Previews(R)** 1969-2007/Feb W2

**File 5: In preparation for coming enhancements, accession numbers will change soon. See HELP NEWS 5 for details.*

[File 6] **NTIS** 1964-2007/Feb W2

[File 8] **Ei Compendex(R)** 1884-2007/Feb W1

[File 73] **EMBASE** 1974-2007/Feb 16

[File 94] **JICST-EPlus** 1985-2007/Feb W3

**File 94: UD200609W2 is the last update for 2006. UD200701W1 is the first update for 2007. The file is complete and up to date.*

[File 35] **Dissertation Abs Online** 1861-2007/Jan

[File 144] **Pascal** 1973-2007/Feb W1

[File 105] **AESIS** 1851-2001/Jul

**File 105: This file is closed (no updates)*

[File 99] **Wilson Appl. Sci & Tech Abs** 1983-2007/Jan

[File 58] **GeoArchive** 1974-2006/Aug

[File 34] **SciSearch(R) Cited Ref Sci** 1990-2007/Feb W2

[File 434] **SciSearch(R) Cited Ref Sci** 1974-1989/Dec

[File 292] **GEOBASE(TM)** 1980-2007/Feb W2

[File 89] **GeoRef** 1785-2007/Jan B1

[File 65] **Inside Conferences** 1993-2007/Feb 15

[File 360] **Specialty Chemicals Update Program** 2000/Q2

**File 360: Full fmts cost $85.00 each for TYPEs, DISPLAYs, & PRINTs. Fmt 7 costs $50.00. SCUP subscribers - use F960. Updating suspended.*

[File 239] **Mathsci** 1940-2007/Mar

[File 347] **JAPIO** Dec 1976-2006/Oct(Updated 070201)

[File 305] **Analytical Abstracts** 1980-2007/Feb W3

**File 305: Alert feature enhanced for multiple files, duplicate removal, customized scheduling. See HELP ALERT.*

[File 350] **Derwent WPIX** 1963-2006/UD=200711

**File 350: DWPI has been enhanced to extend content and functionality of the database. For more info, visit http://www.dialog.com/dwpi/.*

[File 162] **Global Health** 1983-2007/Jan

[File 164] **Allied & Complementary Medicine** 1984-2007/Feb

[File 357] **Derwent Biotech Res.** _1982-2007/Feb W2

[File 315] **ChemEng & Biotec Abs** 1970-2007/Jan

[File 23] **CSA Technology Research Database** 1963-2007/Feb

[File 46] **Corrosion Abstracts** 1966-2007/Feb

[File 68] **Solid State & Superconductivity Abstracts** 1966-2007/Feb

[File 60] **ANTE: Abstracts in New Tech & Engineer** 1966-2007/Feb

[File 33] **Aluminium Industry Abstracts** 1966-2007/Feb

[File 335] **Ceramic Abstracts/World Ceramics Abstracts** 1966-2007/Feb

[File 294] **ONTAP(R) SciSearch(R) Cited Ref Science**


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? d s
Set     Items   Description
S1        797   S AU=(LANGE N? OR LANGE, N?)
S2    2130490   S MRI OR MAGNETIC(1W)(IMAG? OR IMAGING) OR MAGNETIC(W)RESONAN? OR NMR OR
NUCLEAR()MAGNETIC()RESONANCE OR FTNMR OR FTMRI
S3     195509   S MAGNETORESONANCE OR PMR OR PROTON(W)MAGNETIC(W)RESONAN? OR MR()(IMAGE?
OR IMAGING)
S4       8861   S MC=(S01-E02A2 OR S03-E07A OR S01-E02A8A OR S01-E02A1 OR S03-E07C OR
S05-D02B1 OR S03-C02F1)
S5      55030   S IC=(G01N-024/08 OR G01V-003/A75 OR G01R-033/56F OR G01V-003/00 OR
A61B-005/05)
S6      26443   S CC=(A0758 OR A8760I OR B7510N)
S7    2212303   S S2:S6
S8      10896   S DIFFUS?(2N)TENSOR
S9        777   S DT()MRI OR DTMRI
S10    113217   S (FIRST OR SECOND)(2N)VALUE?
S11     19243   S (INTRA OR INTER)(N)SUBJECT? OR INTERSUBJECT? OR INTRASUBJECT?
S12      4770   S SUBJECT(N)SPECIFIC?
S13       168   S ADDITIVE(2N)(OFFSET? OR OFF()SET?)
S14       139   S S1 AND S7
S15         3   S S14 AND S8 AND S9
S16         2   RD  (unique items)
S17         3   S S14 AND (S8 OR S9)
S18         0   S S17 NOT S15
S19        73   S (S8 OR S9) AND (S10 OR S11 OR S12 OR S13)
S20        24   RD  (unique items)
S21        21   S S20 AND S7
S22        19   S S21 NOT S17
S23      2749   S (S8 OR S9)(6N)(ESTIMAT? OR CALCULAT? OR DETERMIN? OR ANALY? OR EVALUAT?
OR ASSESS? OR COMPUT?)
S24       756   S S23 AND VALUE?
S25       544   S S24 AND S7
S26         6   S S25 AND (S11 OR S12 OR S13)
S27         2   RD  (unique items)
S28        80   S S25 AND PD<=20040416
S29        80   S S28 NOT (S15 OR S22 OR S27)
S30        70   RD  (unique items)
```

t 16/9/all

16/9/1 (Item 1 from file: 2) **Links**

INSPEC

09650842

Title: A closed-form method for improving inter-subject coherence in diffusion tensor magnetic resonance imaging

Author Lange, N.; Jones, D.K.; Pierpaoli, C.

Author Affiliation: Dept. of Psychiatry & Biostat., Harvard Univ. Sch. of Medicine & Public Health, Boston, MA, USA

Conference Title: 2004 2nd IEEE International Symposium on Biomedical Imaging: Macro to Nano (IEEE Cat No. 04EX821) **Part** Vol. 2 p. 1506-9 Vol. 2

Publisher: IEEE , Piscataway, NJ, USA

Publication Date: 2004 **Country of Publication:** USA 2 vol. (xxvii+1560) pp.

ISBN: 0 7803 8388 5 **Material Identity Number:** XX-2005-00435

U.S. Copyright Clearance Center Code: 0 7803 8388 5/2004/$20.00

Conference Title: 2004 2nd IEEE International Symposium on Biomedical Imaging: Macro to Nano

Conference Date: 15-18 April 2004 **Conference Location:** Arlington, VA, USA

Language: English **Document Type:** Conference Paper (PA)

Treatment: Theoretical (T)

Abstract: A simple method is presented to reduce within-group inter-subject scatter in **diffusion tensor magnetic resonance imaging** (**DT-MRI**). By "borrowing strength" across co-registered subjects to accommodate indirect effects of unmeasured machine and physiological noise, the method reduces voxel-specific tensor variance across subjects. The technique may aid in fiber bundle atlas construction, in testing differences between groups of subjects, and in automated outlier detection. While the technique does not in itself address **DT-MRI** signal artifact issues directly, it may serve to lessen the effects of these artifacts when their sources have not been measured. An example application to **DT-MRI** of twelve healthy male volunteers at the splenium of the corpus callosum slightly right of midline demonstrates the possible utility of the method. (13 Refs)

Subfile: A B C

Descriptors: biomedical **MRI**; brain; image registration; medical image processing; tensors

Identifiers: closed-form method; inter-subject coherence; **diffusion tensor magnetic resonance imaging**; unmeasured machine; physiological noise; voxel-specific tensor variance; fiber bundle atlas construction; automated outlier detection; **DT-MRI** signal artifact issues; splenium; corpus callosum

Class Codes: A8740 (Biomagnetism); **A8760I** (Medical magnetic resonance imaging and spectroscopy); A8730 (Biophysics of neurophysiological processes); A0210 (Algebra, set theory, and graph theory); **B7510N** (Biomedical magnetic resonance imaging and spectroscopy); B6135 (Optical, image and video signal processing); C7330 (Biology and medical computing); C5260B (Computer vision and image processing techniques)

22/9/7 (Item 7 from file: 155) **Links**
Fulltext available through: USPTO Full Text Retrieval Options SCIENCEDIRECT
MEDLINE(R)

15138561 **PMID:** 15501099
Geometric strategies for neuroanatomic analysis from MRI.

Duncan James S; Papademetris Xenophon; Yang Jing; Jackowski Marcel; Zeng Xiaolan; Staib Lawrence H
Department of Diagnostic Radiology, Yale University, New Haven, CT 06520, USA. james.duncan@yale.edu
NeuroImage (United States) 2004 , 23 Suppl 1 pS34-45 , **ISSN:** 1053-8119--Print **Journal Code:** 9215515
Contract/Grant No.: R01EB000311; EB; NIBIB; R01NS035193; NS; NINDS
Publishing Model Print
Document type: Journal Article; Review
Languages: ENGLISH
Main Citation Owner: NLM
Record type: MEDLINE; Completed
Subfile: INDEX MEDICUS
In this paper, we describe ongoing work in the Image Processing and Analysis Group (IPAG) at Yale University specifically aimed at the analysis of structural information as represented within **magnetic resonance images** (**MRI**) of the human brain. Specifically, we will describe our applied mathematical approaches to the segmentation of cortical and subcortical structure, the analysis of white matter fiber tracks using **diffusion tensor** imaging (DTI), and the **intersubject** registration of neuroanatomical (aMRI) data sets. Many of our methods rally around the use of geometric constraints, statistical (MAP) estimation, and the use of level set evolution strategies. The analysis of gray matter structure and connecting white matter paths combined with the ability to bring all information into a common space via **intersubject** registration should provide us with a rich set of data to investigate structure and variation in the human brain in neuropsychiatric disorders, as well as provide a basis for current work in the development of integrated brain function-structure analysis. (81 Refs.)
Descriptors: *Brain--anatomy and histology--AH; *Diffusion **Magnetic Resonance Imaging**--statistics and numerical data--SN; *Image Processing, Computer-Assisted--statistics and numerical data--SN ; Algorithms; Brain--cytology--CY; Brain Mapping; Cerebral Cortex--anatomy and histology--AH; Cerebral Cortex--cytology--CY; Computer Simulation; Humans; Models, Statistical; Nerve Fibers--physiology--PH; Neural Pathways --anatomy and histology--AH; Neural Pathways--cytology--CY; Research Support, U.S. Gov't, P.H.S.
Record Date Created: 20041025
Record Date Completed: 20050119

22/9/11 (Item 11 from file: 155) **Links**

Fulltext available through: ScienceDirect (Elsevier) USPTO Full Text Retrieval Options SCIENCEDIRECT

MEDLINE(R)

12816542 **PMID:** 10930776

Minimal gradient encoding for robust estimation of diffusion anisotropy.

Papadakis N G; Murrills C D; Hall L D; Huang C L; Adrian Carpenter T

Herchel Smith Laboratory for Medicinal Chemistry, University of Cambridge, Cambridge, UK.

Magnetic resonance imaging (UNITED STATES) Jul 2000 , 18 (6) p671-9 , **ISSN:** 0730-725X--Print **Journal Code:** 8214883

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Subfile: INDEX MEDICUS

This study has investigated the relationship between the noise sensitivity of measurement by **magnetic resonance imaging** (**MRI**) of the **diffusion tensor** (D) of water and the number N of diffusion-weighting (DW) gradient directions, using computer simulations of strongly anisotropic fibers with variable orientation. The DW directions uniformly sampled the diffusion ellipsoid surface. It is shown that the variation of the signal-to-noise ratio (SNR) of three ideally rotationally invariant scalars of D due to variable fiber orientation provides an objective quantitative measure for the diffusion ellipsoid sampling efficiency, which is independent of the SNR value of the baseline signal obtained without DW; the SNR variation decreased asymptotically with increasing N. The minimum number N(0) of DW directions, which minimized the SNR variation of the three scalars of D was determined, thereby achieving the most efficient ellipsoid sampling. The resulting time efficient **diffusion tensor** imaging (DTI) protocols provide robust estimation of diffusion anisotropy in the presence of noise and can improve the repeatability/reliability of DTI experiments when there is high variability in the orientation of similar anisotropic structures, as for example, in studies which require repeated measurement of one individual, **intersubject** comparisons or multicenter studies.

Descriptors: ***Magnetic Resonance Imaging**--methods--MT ; Anisotropy; Computer Simulation; Humans; Models, Theoretical; Research Support, Non-U.S. Gov't; Statistics

Record Date Created: 20001002

Record Date Completed: 20001002

22/9/14 (Item 3 from file: 2) Links
Fulltext available through: Institute of Electrical and Electronics Engineers USPTO Full Text Retrieval Options SCIENCEDIRECT
INSPEC

09145007 **INSPEC Abstract Number:** C2004-12-6130B-006
Title: Interactive volume rendering of thin thread structures within multivalued scientific data sets
Author Wenger, A.; Keefe, D.F.; Zhang, S.; Laidlaw, D.H.
Author Affiliation: Dept. of Comput. Sci., Brown Univ., Providence, RI, USA
Journal: IEEE Transactions on Visualization and Computer Graphics vol.10, no.6 p. 664-72
Publisher: IEEE ,
Publication Date: Nov.-Dec. 2004 **Country of Publication:** USA
CODEN: ITVGEA **ISSN:** 1077-2626
SICI: 1077-2626(200411/12)10:6L.664:IVRT;1-U
Material Identity Number: C466-2004-006
U.S. Copyright Clearance Center Code: 1077-2626/04/$20.00

Language: English **Document Type:** Journal Paper (JP)
Treatment: Applications (A); Practical (P)
Abstract: We present a threads and halos representation for interactive volume rendering of vector-field structure and describe a number of additional components that combine to create effective visualizations of multivalued 3D scientific data. After filtering linear structures, such as flow lines, into a volume representation, we use a multilayer volume rendering approach to simultaneously display this derived volume along with other data values. We demonstrate the utility of threads and halos in clarifying depth relationships within dense renderings and we present results from two scientific applications: visualization of **second**-order tensor **valued magnetic resonance imaging** (**MRI**) data and simulated 3D fluid flow data. In both application areas, the interactivity of the visualizations proved to be important to the domain scientists. Finally, we describe a PC-based implementation of our framework along with domain specific transfer functions, including an exploratory data culling tool, that enable fast data exploration.
(29 Refs)
Subfile: C
Descriptors: biomedical **MRI**; data visualisation; flow visualisation; image texture; rendering (computer graphics); solid modelling; tensors
Identifiers: interactive volume rendering; thin thread structures; multivalued scientific data sets; vector-field structure; **magnetic resonance imaging**; simulated 3D fluid flow data; transfer function; data culling tool; data exploration; scientific visualization; **diffusion tensor** imaging; medical imaging; volume shading; PC graphics hardware
Class Codes: C6130B (Graphics techniques); C5260B (Computer vision and image processing techniques)

22/9/15 (Item 4 from file: 2) **Links**
INSPEC

08161612 **INSPEC Abstract Number:** A2002-05-8760I-024, B2002-02-7510N-097, C2002-02-7330-397
Title: Study of connectivity in the brain using the full diffusion tensor from MRI
Author Batchelor, P.G.; Hill, D.L.G.; Calamante, F.; Atkinson, D.
Author Affiliation: Div. of Radiol. Sci., King's Coll. London, UK
Conference Title: Information Processing in Medical Imaging. 17th International Conference, IPMI 2001. Proceedings (Lecture Notes in Computer Science Vol.2082) p. 121-33
Editor(s): Insana, M.F.; Leahy, R.M.
Publisher: Springer-Verlag , Berlin, Germany
Publication Date: 2001 **Country of Publication:** Germany xvi+537 pp.
ISBN: 3 540 42245 5 **Material Identity Number:** XX-2001-02088
Conference Title: Information Processing in Medical Imaging. 17th International Conference, IPMI 2000. Proceedings
Conference Date: 18-22 June 2001 **Conference Location:** Davis, CA, USA

Language: English **Document Type:** Conference Paper (PA)
Treatment: Theoretical (T)
Abstract: In this paper we propose a novel technique for the analysis of **diffusion tensor magnetic resonance images**. This method involves solving the full diffusion equation over a finite element mesh derived from the MR data. It calculates connection probabilities between points of interest, which can be compared within or between subjects. Unlike traditional tractography, we use all the data in the **diffusion tensor** at each voxel which is likely to increase robustness and make **intersubject** comparisons easier. (25 Refs)
Subfile: A B C
Descriptors: biodiffusion; biological fluid dynamics; biomedical **MRI**; brain; finite element analysis; medical image processing
Identifiers: diffusion tensor magnetic resonance images; full diffusion equation; full **diffusion tensor** ; finite element mesh; connection probabilities; voxel; **intersubject** comparisons; robustness; brain connectivity
Class Codes: A8760I (Medical magnetic resonance imaging and spectroscopy); A8770E (Patient diagnostic methods and instrumentation); A8745 (Biomechanics, biorheology, biological fluid dynamics); A0260 (Numerical approximation and analysis); **B7510N** (Biomedical magnetic resonance imaging and spectroscopy); B6135 (Optical, image and video signal processing); B0290T (Finite element analysis); C7330 (Biology and medical computing); C5260B (Computer vision and image processing techniques); C4185 (Finite element analysis)

22/9/19 (Item 1 from file: 350) **Links**
Derwent WPIX

0014566234 *Drawing available*
WPI Acc no: 2004-748192/200473
XRPX Acc No: N2004-591062
Perfusion imaging method in magnetic resonance imaging, involves determining perfusion tensor, based on magnetic resonance data acquisition with gradient encoding for random motion at different sensitivity values
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); VAN DEN BRINK J S (VBRI-I)
Inventor: VAN DEN BRINK J; VAN DEN BRINK J S

Patent Family (4 patents, 107 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 2004088345	A1	20041014	WO 2004IB50322	A	20040323	200473	B
EP 1611452	A1	20060104	EP 2004722617	A	20040323	200603	E
			WO 2004IB50322	A	20040323		
JP 2006521863	W	20060928	WO 2004IB50322	A	20040323	200667	E
			JP 2006506761	A	20040323		
US 20060241375	A1	20061026	WO 2004IB50322	A	20040323	200671	E
			US 2005551068	A	20050927		

Priority Applications (no., kind, date): EP 2003100848 A 20030331

Patent Details

Patent Number	Kind	Lan	Pgs	Draw	Filing Notes	
WO 2004088345	A1	EN	18	4		
National Designated States,Original	AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW					
Regional Designated States,Original	AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PL PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW					
EP 1611452	A1	EN			PCT Application	WO 2004IB50322
					Based on OPI patent	WO 2004088345
Regional Designated States,Original	AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PL PT RO SE SI SK TR					
JP 2006521863	W	JA	12		PCT Application	WO 2004IB50322
					Based on OPI patent	WO 2004088345
US 20060241375	A1	EN			PCT Application	WO 2004IB50322

Alerting Abstract WO A1
NOVELTY - The **magnetic resonance** data acquisition is performed with gradient encoding for random motion at different sensitivity values, for a set number of times. The perfusion tensor is acquired using the **magnetic resonance** data acquisitions.
DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

1. a computer program product in digital storage medium with program for determining perfusion tensor; and
2. a perfusion imaging apparatus.

USE - For magnetic resonance imaging (MRI) used for **medical purposes such as** abdominal imaging, especially for diffusion tensor imaging (DTI).
ADVANTAGE - Enables to perform required data acquisitions for a couple of slices through the body within a single breath, for e.g. in less than 16 seconds.
DESCRIPTION OF DRAWINGS - The figure is a logarithmic diagram showing the magnetic resonance imaging signals for the **determination of perfusion** tensor and imaging.

Title Terms /Index Terms/Additional Words: PERFUSION; IMAGE; METHOD; MAGNETIC; RESONANCE; DETERMINE; TENSOR; BASED; DATA; ACQUIRE; GRADIENT; ENCODE; RANDOM; MOTION; SENSITIVE; VALUE

Class Codes

International Patent Classification

IPC	Class Level	Scope	Position	Status	Version Date
A61B-0005/055	A	I	F	B	20060101
G01R-0033/563	A	I		R	20060101
G01R-0033/563	A	I	F	B	19950101
A61B-0005/05	A	I	F	B	20060101
G01R-0033/54	C	I		R	20060101
G01R-0033/54	C	I	F	B	19950101

US Classification, Issued: 600410000

File Segment: EngPI; EPI;
DWPI Class: S01; S03; S05; T01; W04; P31
Manual Codes (EPI/S-X): **S01-E02A2**; **S03-E07A**; S05-D02B2; T01-J06A; T01-J10D; T01-S03; W04-P01A

Original Publication Data by Authority

EPO

Publication No. EP 1611452 A1 (Update 200603 E)
Publication Date: 20060104
VERFAHREN ZUR MAGNETRESONANZ-PERFUSIONSABBILDUNG
A METHOD OF MAGNETIC RESONANCE PERFUSION IMAGING
PROCEDE DE VISUALISATION DE PERFUSION PAR RESONANCE MAGNETIQUE
Assignee: Koninklijke Philips Electronics N.V., Groenewoudseweg 1, 5621 BA Eindhoven, NL (PHIG)
Inventor: VAN DEN BRINK J
Agent: Cohen, Julius Simon, Philips Intellectual Property & Standards, P.O. Box 220, 5600 AE Eindhoven, NL
Language: EN
Application: EP 2004722617 A 20040323 (Local application)
WO 2004IB50322 A 20040323 (PCT Application)
Priority: EP 2003100848 A 20030331
Related Publication: WO 2004088345 A (Based on OPI patent)
Designated States: (Regional Original) AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PL PT RO SE SI SK TR
Original IPC: G01R-33/54(B,I,H,98,19950101,20041015,C,F) G01R-33/563(B,I,H,EP,19950101,20041015,A,F)
Current IPC: G01R-33/54(B,A,I,H,98,19950101,20041015,C,F) G01R-33/563(B,I,H,EP,19950101,20041015,A,F)
Original Abstract: The present invention relates to a method of perfusion imaging comprising: performing a first magnetic resonance data acquisition (A) at a first sensitivity (b) value, performing a set of at least six second magnetic resonance data acquisitions (B_1, B_2,... B_6) with gradiant encodings in different directions at second sensitivity (b) values, determining a perfusion tensor based on the magnetic resonance data acquisitions, performing a perfusion tensor visualitation step.

Japan

Publication No. JP 2006521863 W (Update 200667 E)
Publication Date: 20060928
Language: JA (12 pages)
Application: WO 2004IB50322 A 20040323 (PCT Application)
JP 2006506761 A 20040323 (Local application)
Priority: EP 2003100848 A 20030331
Related Publication: WO 2004088345 A (Based on OPI patent)
Original IPC: A61B-5/055(B,I,H,JP,20060101,20060901,A,F)
Current IPC: A61B-5/055(B,I,H,JP,20060101,20060901,A,F)

United States

Publication No. US 20060241375 A1 (Update 200671 E)
Publication Date: 20061026
Method of magnetic resonance perfusion imaging
Assignee: Van Den Brink, Johan Samuel, Eindhoven, NL Residence: NL Nationality: NL (VBRI-I)
Inventor: Van Den Brink, Johan Samuel, Eindhoven, NL Residence: NL Nationality: NL
Agent: PHILIPS INTELLECTUAL PROPERTY & STANDARDS, 595 MINER ROAD, CLEVELAND, OH, US
Language: EN

Application: WO 2004IB50322 A 20040323 (PCT Application)
US 2005551068 A 20050927 (Local application)
Priority: EP 2003100848 A 20030331
Original IPC: A61B-5/05(B,I,H,US,20060101,20061026,A,F)
Current IPC: A61B-5/05(B,I,H,US,20060101,20061026,A,F)
Original US Class (secondary): 600410
Original Abstract: The present invention relates to a method of perfusion imaging comprising: performing a first magnetic resonance data acquisition (A) at a first sensitivity (b) value, performing a set of at least six second magnetic resonance data acquisitions (B_1, B_2,.. .. B_6) with gradiant encodings in different directions at second sensitivity (b) values, determining a perfusion tensor based on the magnetic resonance data acquisitions, performing a perfusion tensor visualitation step.
Claim:

1. 1. A method of perfusion imaging comprising:
    - performing a first magnetic resonance data acquisition with gradient encodings for random motion at a first sensitivity value,
    - performing a set of at least six second magnetic resonance data acquisitions with gradient encodings for random motion in different directions at second sensitivity values,
    - determining a perfusion tensor based on the magnetic resonance data acquisitions.

WIPO

Publication No. WO 2004088345 A1 (Update 200473 B)
Publication Date: 20041014
A METHOD OF MAGNETIC RESONANCE PERFUSION IMAGING
PROCEDE DE VISUALISATION DE PERFUSION PAR RESONANCE MAGNETIQUE
Assignee: *(except US)* KONINKLIJKE PHILIPS ELECTRONICS N.V., Groenewoudseweg 1, NL-5621 BA Eindhoven, NL Residence: NL Nationality: NL (PHIG)
(only US) VAN DEN BRINK, Johan, S., c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven, NL Residence: NL Nationality: NL
Inventor: VAN DEN BRINK, Johan, S., c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven, NL Residence: NL Nationality: NL
Agent: COHEN, Julius, S., Prof. Holstlaan 6, NL-5656 AA Eindhoven, NL
Language: EN (18 pages, 4 drawings)
Application: WO 2004IB50322 A 20040323 (Local application)
Priority: EP 2003100848 A 20030331
Designated States: (National Original) AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(Regional Original) AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PL PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
Original IPC: G01R-33/563(A)
Current IPC: G01R-33/54(R,I,M,EP,20060101,20051008,C) G01R-33/563(R,I,M,EP,20060101,20051008,A)
Original Abstract: The present invention relates to a method of perfusion imaging comprising: performing a first

magnetic resonance data acquisition (A) at a first sensitivity (b) value, performing a set of at least six second magnetic resonance data acquisitions (B_1, B_2,... B_6) with gradiant encodings in different directions at second sensitivity (b) values, determining a perfusion tensor based on the magnetic resonance data acquisitions, performing a perfusion tensor visualitation step.

La presente invention concerne un procede de visualisation de perfusion consistant a realiser une premiere acquisition dé donnees par resonance magnetique (A) a une premiere valeur de sensibilite (b), a realiser un ensemble d'au moins six secondes acquisitions de donnees par resonance magnetique (B_1, B_2,...B_6) a l'aide de codages a gradient dans differentes directions a des deuxiemes valeurs de sensibilite (b), a determiner un tenseur de perfusions sur la base des acquisitions de donnees par resonance magnetique, et a effectuer une etape de visualisation de ce tenseur de perfusion.

30/9/2 (Item 1 from file: 73) **Links**

Fulltext available through: USPTO Full Text Retrieval Options SCIENCEDIRECT

EMBASE

14116904 **EMBASE No:** 2006541406

Diffusion-tensor magnetic resonance imaging in brain white matter diseases

Chu S.-G.; Shen T.-Z.; Chen X.-R.

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Chinese Journal of Clinical Rehabilitation (CHIN. J. CLIN. REHAB.) (China) 2002 , 6/23 (3609-3610)

CODEN: ZLKHA **ISSN:** 1671-5926

Document Type: Journal ; Article

Language: ENGLISH **Summary Language:** ENGLISH

Number Of References: 8

Objective: To **evaluate** the usefulness of **diffusion- tensor MR imaging** in brain white matter diseases. Methods: A combined conventional and diffusion tensor **MRI** were obtained from 10 multiple sclerosis, 10 multiple lacunar infarction, 3 cyslicercosis, 1 angiitis, 1 morphinist and 10 healthy control volunteers. After obtaining mean diffusivity (D) and fractional anisotropy images and image coregistration, the correlations of the lesions and the white matter pathways were investigated. D and AI **values** were measured form four big lesions which can be seen in T2W1 and compared to contralateral white matter. Also D and AI **value** of four different anatomic locations of normal-appearing white matter regions were measured in all patients and controls. Results: Whereas the lesions of infarction, cysticercosis and angiitis were in and outside the white matter pathways, all plaques of multiple sclerosis were inside the white matter pathways. The brain white matter lesions by 1 morphinist were beside the lateral ventricle with big patchy appearance, which was partly inside white matter. For MS, D **value** was higher in lesions than control white matter. But for other diseases, D **value** could be seen higher or lower compared to healthy side. AI **values** were lower in all lesions. D **value** was higher and AI was lower in normal appearing brain white matter when comparing MS to other cases or healthy control volunteers. Conclusion: **Diffusion tensor MR images** can **determine** the correlations of the lesions and brain white matter pathways. The changes of D and AI **values** can improve specificity in differential diagnoses though quantitatively analyzing the tissue damage in lesions and normal-appearing brain white matter.

MEDICAL DESCRIPTORS:

* diffusion tensor imaging; *multiple sclerosis; *brain infarction; *brain vasculitis; *brain cysticercosis white matter; medical assessment; brain disease; anisotropy; lateral brain ventricle; clinical feature; quantitative analysis; human; male; female; clinical article; controlled study; adolescent; adult; article

SECTION HEADINGS:

005 General Pathology and Pathological Anatomy

008 Neurology and Neurosurgery

014 Radiology

30/9/4 (Item 3 from file: 73) Links
Fulltext available through: custom link USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12957144 **EMBASE No:** 2005017793

Use of fractional anisotropy value by diffusion tensor MRI for preoperative diagnosis of astrocytic tumors: Case report

Misaki T.; Beppu T.; Inoue T.; Ogasawara K.; Ogawa A.; Kabasawa H.
Dr. T. Beppu, Department of Neurosurgery, Iwate Medical University, Uchimaru 19-1, Morioka 020-8505 Japan
Journal of Neuro-Oncology (J. NEURO-ONCOL.) (United States) 2004 , 70/3 (343-348)
CODEN: JNODD **ISSN:** 0167-594X
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 19

The fractional anisotropy (FA) **value calculated** by **diffusion tensor MRI** can indicate the degree of directionality of water diffusion in astrocytic tumors. Here, we report a case of anaplastic astrocytoma in which FA proved invaluable for the preoperative differential diagnosis. A 60-year-old man complained of headache, and underwent routine neuroimaging and DTI. The routine images suggested a low-grade glioma in the left temporal lobe, based on lack of enhancement on **MRI** with contrast medium and lack of tumor staining on angiograms, whereas FA **value** was very high. Based on these findings, a preoperative diagnosis of high-grade glioma was suspected. The surgical specimen exhibited the histological features of anaplastic astrocytoma with a high density of spindle shaped cells and low vascularity. In this report, we discuss the relationship between FA and other characteristics of the present tumor, and discuss the utility of FA measurement in astrocytic tumors. (c) Kluwer Academic Publishers 2004.

Device Brand Name/Manufacturer Name: Signa V/I/GE Healthcare/United States
Device Manufacturer Names: GE Healthcare/United States
MEDICAL DESCRIPTORS:
* glioblastoma--diagnosis--di; *glioblastoma--surgery--su; *diffusion tensor imaging
anisotropy; **nuclear magnetic resonance imaging**; preoperative evaluation; diagnostic **value**; differential diagnosis; headache; neuroimaging; glioma; temporal lobe; contrast enhancement; angiography; histology; cell density; spindle cell; tumor vascularization; human; male; case report; human tissue; adult; article
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology
016 Cancer
027 Biophysics, Bioengineering and Medical Instrumentation

30/9/7 (Item 6 from file: 73) **Links**
Fulltext available through: USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12917790 **EMBASE No:** 2004519836
The values of diffusion tensor imaging and functional MRI in evaluating profound sensorineural hearing loss

Lee S-.H.; Chang Y.; Lee J.E.; Cho J.-H.
S.H. Lee, Department of Otolaryngology, School of Medicine, Kyungpook National University, 1370 Sankyuk-dong Buk-ku, Daegu 702-701 South Korea
Author Email: leeshu@knu.ac.kr
Cochlear Implants International (COCHLEAR IMPLANTS INT.) (United Kingdom) 2004 , 5/SUPPL. 1 (149-152)
CODEN: CIIOA **ISSN:** 1467-0100
Document Type: Journal ; Article
Language: ENGLISH
MEDICAL DESCRIPTORS:
* diffusion tensor imaging; ***nuclear magnetic resonance imaging**; *perception deafness--diagnosis--di diagnostic imaging; diagnostic **value**; nervous system function; auditory system function; neurotransmission; diagnostic accuracy; information processing; informed consent; anisotropy; cochlear nucleus; olivary nucleus; inferior colliculus; auditory cortex; human; male; female; clinical article; controlled study; child; article
SECTION HEADINGS:
007 Pediatrics and Pediatric Surgery
008 Neurology and Neurosurgery
014 Radiology
027 Biophysics, Bioengineering and Medical Instrumentation

30/9/8 (Item 7 from file: 73) Links
Fulltext available through: John Wiley and Sons USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12916105 **EMBASE No:** 2004517671
Contribution of diffusion tensor imaging to delineation of gliomas and glioblastomas

Tropine A.; Vucurevic G.; Delani P.; Boor S.; Hopf N.; Bohl J.; Stoeter P.
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Journal of Magnetic Resonance Imaging (J. MAGN. RESON. IMAGING) (United States) 2004 , 20/6 (905-912)
CODEN: JMRIF **ISSN:** 1053-1807
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 26

Purpose: To **determine** if the **diffusion tensor** imaging (DTI) parameters fractional anisotropy (FA) and mean diffusivity (MD) can differentiate between accompanying edema and tumor cell infiltration of white matter (WM) beyond the tumor edge as defined from conventional **MRI** in low- and high-grade gliomas. Materials and Methods: We examined 12 patients with high-grade gliomas/glioblastomas and eight patients with low-grade gliomas and compared them to 10 patients with meningiomas, in which no tumor Infiltration Is expected. The tumor was defined as the enhancing area in glioblastomas and meningiomas and as the area of increased T2-signal in low-grade gliomas. FA and MD were measured In the center of the tumor and in the adjacent WM. The contralateral WM and internal capsule were used as an internal standard. Results: Comparing the WM areas of increased T2- signal adjacent to meningiomas and glioblastomas, we saw a trend (without significance) towards a reduction of FA, but not of MD, in glioblastomas. We found no changes of FA and MD in the WM adjacent to low-grade gliomas (without T2-signal increase) compared to the WM of the contralateral hemisphere. In meningiomas and high-grade gliomas/glioblastomas, a narrow rim of significantly ($P < 0.01$) increased FA and decreased MD **values** around the enhancing tumor area was seen, whereas in low-grade gliomas, such a rim could not be defined. There was no contribution of FA or MD to grading of gliomas. Conclusion: In glioblastomas, a reduction of FA in the edematous area surrounding the tumor may indicate tumor cell infiltration, but a reliable differentiation between infiltration and vasogenic edema is not yet possible on the basis of DTI. The additional finding of a narrow rim of increased FA and decreased MD at the edge of glioblastomas (as well as in meningiomas) may be caused by compressed WM fibers and/or increased vascularity, but does not contribute to exclude peripheral cellular infiltration.

MEDICAL DESCRIPTORS:
* diffusion tensor imaging; *glioma--diagnosis--di; *glioblastoma--diagnosis --di
anisotropy; edema; tumor cell culture; cell infiltration; white matter; cancer grading; meningioma--diagnosis--di; hemisphere; statistical significance; reliability; human; male; female; clinical article; adolescent; aged; child; adult; article; priority journal
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology

30/9/10 (Item 9 from file: 73) **Links**

Fulltext available through: Ebsco Host EJS (Electronic Journals Service) USPTO Full Text Retrieval Options SCIENCEDIRECT ProQuest

EMBASE

12907532 **EMBASE No:** 2004511339

Detecting glioma invasion of the corpus callosum using diffusion tensor imaging

Price S.J.; Pen(tilde)a A.; Burnet N.G.; Pickard J.D.; Gillard J.H.
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British Journal of Neurosurgery (BR. J. NEUROSURG.) (United Kingdom) 2004 , 18/4 (391-395)
CODEN: BJNEE **ISSN:** 0268-8697
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 19

We present a patient with a recurrent glioblastoma and abnormalities of the corpus callosum seen on diffusion tensor **MRI** that were not seen on conventional imaging. These abnormalities preceded the development of the tumour. We describe the technique of diffusion tissue signatures to assess tissue infiltration by rumours compared with **values** from normal volunteers.

Device Brand Name/Manufacturer Name: 3 Tesla/Bruker/Germany; MATLAB/Mathworks/United States
Device Manufacturer Names: Bruker/Germany; Mathworks/United States
MEDICAL DESCRIPTORS:
* glioblastoma--diagnosis--di; *glioblastoma--radiotherapy--rt; *glioblastoma --surgery--su; *cancer invasion; *corpus callosum
diffusion tensor imaging; focal epilepsy; **computer** assisted tomography; cancer radiotherapy; dysphasia; **nuclear magnetic resonance imaging**; device; human; female; case report; adult; article; priority journal
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology
016 Cancer
027 Biophysics, Bioengineering and Medical Instrumentation

30/9/13 (Item 12 from file: 73) **Links**
Fulltext available through: USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12780762 **EMBASE No:** 2004370637
Parallel imaging and diffusion tensor imaging for diffusion-weighted MRI of the liver: Preliminary experience in healthy volunteers

Taouli B.; Martin A.J.; Qayyum A.; Merriman R.B.; Vigneron D.; Yen B.M.; Coakley F.V.
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American Journal of Roentgenology (AM. J. ROENTGENOL.) (United States) 2004 , 183/3 (677-680)
CODEN: AJROA **ISSN:** 0361-803X
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 25

OBJECTIVE. Our aim was to **determine** whether parallel imaging and **diffusion tensor** imaging affect the measurement of apparent diffusion coefficient (ADC) during diffusion-weighted **MRI** of the liver in healthy volunteers. SUBJECTS AND METHODS. We performed breath-hold single-shot echo-planar diffusion-weighted **MRI** of the liver in 10 healthy volunteers using conventional diffusion, conventional diffusion with parallel imaging, and diffusion tensor with parallel imaging sequences. TE **values** for the three sequences were 83, 74, and 63, respectively. Liver signal intensity was measured on all sequences and normalized to the SD of the measurement. Hepatic ADC was calculated by acquiring all sequences with b **values** of 0 and 500 sec/mmSUP2. RESULTS. The normalized liver signal intensity was higher on diffusion tensor with parallel imaging and conventional diffusion with parallel imaging than on conventional diffusion without parallel imaging for a b **value** of 500 sec/mmSUP2 (13.0 and 10.1 vs 9.1, respectively; $p < 0.03$) and for a b **value** of 0 sec/mm SUP2 (9.0 and 7.6 vs 6.9, respectively; without reaching a significant difference, $p = 0.12$). Hepatic ADC was not significantly different between sequences ($p = 0.16$). CONCLUSION. Higher signal intensity can be obtained when using parallel imaging and diffusion tensor imaging during diffusion-weighted **MRI** of the liver without compromising hepatic ADC measurement.

MEDICAL DESCRIPTORS:
* liver; ***nuclear magnetic resonance imaging**; * diffusion weighted imaging; *technique
diffusion coefficient; signal processing; calculation; human; male; female; normal human; adult; article; priority journal
Medical Terms (Uncontrolled): parallel imaging; tensor imaging; apparent diffusion coefficient; echo time **value**; signal intensity
SECTION HEADINGS:
014 Radiology
048 Gastroenterology

30/9/18 (Item 17 from file: 73) **Links**
Fulltext available through: custom link USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12575032 **EMBASE No:** 2004173422
Diffusion tensor imaging in multiple sclerosis: A tool for monitoring changes in normal-appearing white matter

Cassol E.; Ranjeva J.-P.; Ibarrola D.; Mekies C.; Manelfe C.; Clanet M.; Berry I.
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Author Email: clanet@cict.fr
Multiple Sclerosis (MULT. SCLER.) (United Kingdom) 2004 , 10/2 (188-196)
CODEN: MUSCF **ISSN:** 1352-4585
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 30

Our objectives were to **determine** the reproducibility of **diffusion tensor** imaging (DTI) in volunteers and to **evaluate** the ability of the method to monitor longitudinal changes occurring in the normal-appearing white matter (NAWM) of patients with multiple sclerosis (MS). DTI was performed three-monthly for one year in seven MS patients: three relapsing-remitting (RRMS), three secondary progressive (SPMS) and one relapsing SP. They were selected with a limited cerebral lesion load. Seven age- and sex-matched controls also underwent monthly examinations for three months. Diffusivity and anisotropy were quantified over the segmented whole supratentorial white matter, with the indices of trace (Tr) and fractional anisotropy (FA). Results obtained in volunteers show the reproducibility of the method. Patients had higher trace and lower anisotropy than matched controls ($P < 0.0001$). Over the follow-up, both Tr and FA indicated a recovery after the acute phase in RRMS and a progressive shift towards abnormal **values** in SPMS. Although this result is not statistically significant it suggests that DTI is sensitive to microscopic changes occurring in tissue of normal appearance in conventional images and could be useful for monitoring the course of the disease, even though it was unable to clearly distinguish between the various physiopathological processes involved. (c) Arnold 2004.

MEDICAL DESCRIPTORS:
* multiple sclerosis--diagnosis--di; *diffusion tensor imaging
patient monitoring; disease activity; white matter; reproducibility; volunteer; longitudinal study; relapse; remission; patient selection; brain injury; neurologic examination; anisotropy; quantitative analysis; follow up; convalescence; sensitivity analysis; brain tissue; disease course; pathophysiology; **nuclear magnetic resonance imaging**; image processing; intermethod comparison; human; male; female; clinical article; controlled study; adult; article
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology

30/9/22 (Item 21 from file: 73) Links
Fulltext available through: John Wiley and Sons USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12467196 **EMBASE No:** 2004060990

Does Fractional Anisotropy Have Better Noise Immunity Characteristics Than Relative Anisotropy in Diffusion Tensor MRI? An Analytical Approach

Hasan K.M.; Alexander A.L.; Narayana P.A.
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Author Email: Khader.M.Hasan@uth.tmc.edu
Magnetic Resonance in Medicine (MAGN. RESON. MED.) (United States) 2004 , 51/2 (413-417)
CODEN: MRMEE **ISSN:** 0740-3194
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 21

Fractional anisotropy (FA) and relative anisotropy (RA) are the two most commonly used scalar measures of anisotropy in diffusion tensor (DT) **MRI**. While a few published studies have shown that FA has superior noise immunity relative to RA, no theoretical basis has been proposed to explain this behavior. In the current study, the diffusion tensor invariants were used to derive a simple analytical expression that directly relates RA and FA. An analysis based on that analytical expression demonstrated that the FA images have a higher signal-to-noise ratio (SNR) than RA for any **value** of tensor anisotropy RA or FA > 0. This theoretical behavior was verified using both Monte Carlo simulations and bootstrap **analysis** of **DT-MRI** data acquired in a spherical water phantom and normal human subjects. (c) 2004 Wiley-Liss, Inc.

MEDICAL DESCRIPTORS:
* anisotropy; *diffusion tensor imaging
analytic method; image analysis; signal noise ratio; Monte Carlo method; phantom; comparative study; human; human experiment; normal human; controlled study; article
SECTION HEADINGS:
014 Radiology

30/9/27 (Item 26 from file: 73) **Links**
Fulltext available through: SpringerLink USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

12214508 **EMBASE No:** 2003326155
Assessment of axonal degeneration in Alzheimer's disease with diffusion tensor MRI

DIFFUSION TENSOR IMAGING ZUR ERFASSUNG AXONALER DEGENERATION BEI MORBUS ALZHEIMER
Stahl R.; Dietrich O.; Teipel S.; Hampel H.; Reiser M.F.; Schoenberg S.O.
Dr. R. Stahl, Inst. Klin. Radiol. - Grosshadern, Klinikum der Universitat Munchen, Marchioninistr. 15, 81377 Munchen Germany
Radiologe (RADIOLOGE) (Germany) 01 JUL 2003 , 43/7 (566-575)
CODEN: RDLGB **ISSN:** 0033-832X
Document Type: Journal ; Article
Language: GERMAN **Summary Language:** ENGLISH; GERMAN
Number Of References: 24

Purpose. Alzheimer disease (AD) causes cortical degeneration with subsequent degenerative changes of the white matter. The aim of this study was to investigate the extent of white matter tissue damage of patients with Alzheimer's disease in comparison with healthy subjects using diffusion tensor **MRI** (DTI). The **value** of integrated parallel imaging techniques (iPAT) for reduction of image distortion was assessed. Material and methods. We studied 9 patients with mild AD and 10 age and gender matched healthy controls. DTI brain scans were obtained on a 1.5 tesla system (Siemens Magnetom Sonata) using parallel imaging (iPAT) and an EPI diffusion sequence with TE/TR 71 ms/6000 ms. We used an 8-element head coil and a GRAPPA reconstruction algorithm with an acceleration factor of 2. From the tensor, the mean diffusivity (D), the fractional anisotropy (FA), and the relative anisotropy (RA) of several white matter regions were determined. Results. FA was significantly lower ($p <0,05$) in the white matter of the genu of corpus callosum from patients with AD than in the corresponding regions from healthy controls. There was a trend observed for slightly higher ADC **values** in the AD group ($p=0,06$). No significant changes were observed in the regions of the splenium, internal capsule, pericallosal areas, frontal, temporal, parietal, and occipital lobe. The images obtained with iPAT contained substantially less susceptibility artefacts and were less distorted than images acquired with non-parallel imaging technique. Conclusions. DTI is a method with potential to assess early stages of white matter damage in vivo. The altered FA and ADC **values** in the genu of corpus callosum of patients with AD presumably reflect the microscopic white matter degeneration. Acquisition time can be reduced by iPAT methods with less image distortion from susceptibility artefacts resulting in a more accurate **calculation** of the **diffusion tensor**.

Device Brand Name/Manufacturer Name: Siemens Magnetom Sonata/Siemens
Device Manufacturer Names: Siemens
MEDICAL DESCRIPTORS:
* nerve fiber degeneration--diagnosis--di; *Alzheimer disease; *diffusion tensor imaging
white matter; brain injury--diagnosis--di; imaging system; algorithm; anisotropy; corpus callosum; brain region; human; male; female; clinical article; controlled study; aged; adult; article
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology
027 Biophysics, Bioengineering and Medical Instrumentation

30/9/49 (Item 48 from file: 73) **Links**
Fulltext available through: USPTO Full Text Retrieval Options SCIENCEDIRECT
EMBASE

11032959 **EMBASE No:** 2000172564
Demyelinating plaques in relapsing-remitting and secondary-progressive multiple sclerosis: Assessment with diffusion MR imaging

Scanderbeg A.C.; Tomaiuolo F.; Sabatini U.; Nocentini U.; Grasso M.G.; Caltagirone C.
Dr. A.C. Scanderbeg, Department of Radiology, I.R.C.C.S., via Ardeatina 306, 00179 Rome Italy
American Journal of Neuroradiology (AM. J. NEURORADIOL.) (United States) 2000 , 21/5 (862-868)
CODEN: AAJND **ISSN:** 0195-6108
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 39

BACKGROUND AND PURPOSE: Conventional **MR imaging** does not provide specific information that can be reliably associated with the pathologic substrate and clinical status of patients with multiple sclerosis (MS). Our goals were 1) to determine whether the orientationally averaged water diffusion coefficient (<D>) can be used to distinguish between plaques of different severity in these patients and 2) to assess possible correlations between <D> **values** and disease duration, Expanded Disability Status Scale (EDSS) score, and signal intensity on T1-weighted **MR images**. METHODS: Twenty patients (10 with relapsing-remitting MS and 10 with secondary-progressive MS) and 11 healthy volunteers underwent a combined conventional and diffusion-weighted MR study of the brain. <D>, a parameter that is proportional to the trace of the **diffusion tensor**, was **computed** by averaging the apparent diffusion coefficients measured in the x, y, and z directions. <D> measurements were obtained for selected areas of white matter plaques. Differences in <D> among the three groups were tested using analysis of variance. RESULTS: <D> was significantly higher (1.445 (+) 0.129 x 10SUP-3 mmSUP2/s) in secondary-progressive lesions than in relapsing-remitting lesions (0.951 (+) 0.08), and both **values** were higher than <D> in normal white matter (0.732 (+) 0.02). There was a significant negative correlation between <D> and the degree of hypointensity on T1-weighted images, and a positive correlation between <D> and both EDSS score and disease duration. CONCLUSION: Our findings suggest that <D> is useful for distinguishing MS lesions of different severities, which are associated with different degrees of clinical disability.

MEDICAL DESCRIPTORS:
* demyelinating disease--diagnosis--di; *multiple sclerosis--diagnosis--di; * **nuclear magnetic resonance imaging**
recurrent disease; disease course; disease severity; disease duration; scoring system; correlation function; human; male; female; clinical article ; controlled study; adult; article
SECTION HEADINGS:
008 Neurology and Neurosurgery
014 Radiology

30/9/61 (Item 2 from file: 34) Links
Fulltext available through: ScienceDirect (Elsevier) USPTO Full Text Retrieval Options SCIENCEDIRECT
SciSearch(R) Cited Ref Sci

09649793 **Genuine Article#:** 431JN **Number of References:** 34
Determination of the rotational diffusion tensor of macromolecules in solution from NMR relaxation data with a combination of exact and approximate methods - Application to the determination of interdomain orientation in multidomain proteins

Author: Ghose R; Fushman D; Cowburn D (REPRINT)
Corporate Source: Rockefeller Univ,1230 York Ave/New York//NY/10021 (REPRINT); Rockefeller Univ,New York//NY/10021
Journal: JOURNAL OF MAGNETIC RESONANCE , 2001 , V 149 , N2 (APR) , P 204-217
ISSN: 1090-7807 **Publication date: 20010400**
Publisher: ACADEMIC PRESS INC , 525 B ST, STE 1900, SAN DIEGO, CA 92101-4495 USA
Language: English **Document Type:** ARTICLE
Geographic Location: USA
Journal Subject Category: BIOCHEMICAL RESEARCH METHODS; PHYSICS, ATOMIC, MOLECULAR & CHEMICAL
Abstract: In this paper we present a method for **determining** the rotational **diffusion tensor** from **NMR** relaxation data using a combination of approximate and exact methods. The approximate method, which is computationally less intensive, computes **values** of the principal components of the **diffusion tensor** and **estimates** the Euler angles, which relate the principal axis frame of the diffusion tensor to the molecular frame. The approximate **values** of the principal components are then used as starting points for an exact calculation by a downhill simplex search for the principal components of the tensor over a grid of the space of Euler angles relating the diffusion tensor frame to the molecular frame. The search space of Euler angles is restricted using the tensor orientations calculated using the approximate method. The utility of this approach is demonstrated using both simulated and experimental relaxation data. A quality factor that determines the extent of the agreement between the measured and predicted relaxation data is provided. This approach is then used to estimate the relative orientation of SH3 and SH2 domains in the SH(32) dual-domain construct of Abelson kinase complexed with a consolidated ligand. (C) 2001 Academic Press.
Descriptors--Author Keywords: relaxation ; rotational diffusion tensor ; singular **value** decomposition ; domain orientation
Identifiers-- KeyWord Plus(R): RESIDUAL DIPOLAR COUPLINGS; CHEMICAL-SHIFT ANISOTROPY; BACKBONE DYNAMICS; N-15 RELAXATION; CRYSTAL-STRUCTURES; HUMAN UBIQUITIN; SH2 DOMAIN; INFORMATION; REFINEMENT; PEPTIDE
Cited References:
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ANDREC M, 2000, V146, P66, J MAGN RESON
BAX A, 1997, V10, P289, J BIOMOL NMR
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CLORE GM, 1998, V120, P4889, J AM CHEM SOC
CLORE GM, 1999, V121, P9008, J AM CHEM SOC
CLORE GM, 1998, V120, P10571, J AM CHEM SOC
CLORE GM, 1998, V95, P5891, P NATL ACAD SCI USA
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Evidence of red cell alignment in the magnetic field of an NMR spectrometer based on the diffusion tensor of water

Author: Kuchel PW (REPRINT) ; Durrant CJ; Chapman BE; Jarrett PS; Regan DG

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Abstract: The alignment of human erythrocytes in aqueous suspensions in the magnetic field B-0 (called the z-direction) of an **NMR** spectrometer was shown by **calculating** the **diffusion tensor** for water in the sample. The diffusion was measured using a pulsed-held-gradient spin-echo **NMR** method. The extent of diffusion anisotropy for water was exemplified by the **values** of the apparent diffusion coefficients with erythrocytes of normal shape and volume: for a typical experiment the **values** for the x-, y-, and z-directions were (6.88 +/- 0.17) x 10(-10), (7.07 +/- 0.17) x 10(-10), and (10.20 +/- 0.17) x 10(-10) m(2) s(-1), respectively. Cells in hypo- and hyperosmotic media were also studied and they too showed the anisotropy of the apparent diffusion coefficients but the extents were different. A new method of data analysis was developed using the Standard Add-On Packages in a Mathematica program, The experimental findings support evidence of erythrocyte alignment that was previously obtained with a high-field-gradient q-space method. (C) 2000 Academic Press.

Descriptors--Author Keywords: cell alignment ; PGSE **NMR** ; water diffusion ; multivariate analysis ; erythrocytes ; magnetic field effect on cells

Identifiers-- KeyWord Plus(R): ERYTHROCYTE SUSPENSIONS; SELF-DIFFUSION; SPIN-ECHO; ORIENTATION; DIFFRACTION; FEATURES; TISSUES; **MRI**

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Solid State & Superconductivity Abstracts

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A normal distribution for tensor-valued random variables: applications to diffusion tensor MRI

Basser, P J; Pajevic, S

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Abstract:

Diffusion tensor **magnetic resonance imaging** (**DT -MRI**) provides a statistical **estimate** of a symmetric, second-order **diffusion tensor** of water, D, in each voxel within an imaging volume. We propose a new normal distribution, p(D) /prop/ exp(-1/2 D : A : D), which describes the variability of D in an ideal DT- **MRI** experiment. The scalar invariant, D : A : D, is the contraction of a positive definite symmetric, fourth-order precision tensor, A, and D. A correspondence is established between D : A : D and the elastic strain energy density function in continuum mechanics-specifically between D and the second-order infinitesimal strain tensor, and between A and the fourth-order tensor of elastic coefficients. We show that A can be further classified according to different classical elastic symmetries (i.e., isotropy, transverse isotropy, orthotropy, planar symmetry, and anisotropy). When A is an isotropic fourth-order tensor, we derive an explicit analytic expression for p(D), and for the distribution of the three eigenvalues of D, p(/gamma/(1), /gamma/(2), /gamma/(3)), which are confirmed by Monte Carlo simulations. We show how A can be **estimated** from either real or synthetic **DT-MRI** data for any given experimental design. Here we propose a new criterion for an optimal experimental design: that A be an isotropic fourth-order tensor. This condition ensures that the statistical properties of D (and quantities derived from it) are rotationally invariant. We also investigate the degree of isotropy of several DT-**MRI** experimental designs. Finally, we show that the univariate and multivariate distributions are special cases of the more general tensor-variate normal distribution, and suggest how to generalize p(D) to treat normal random tensor variables that are of third- (or higher) order. We expect that this new distribution, p(D), should be useful in feature extraction; in developing a hypothesis testing framework for segmenting and classifying noisy, discrete tensor data; and in designing experiments to measure tensor quantities.

Descriptors: Mathematical analysis; Tensors; Computer simulation; Normal distribution; Isotropy; Diffusion; Monte Carlo methods; Symmetry; Strain; Invariants; Exact solutions; Eigenvalues; PRoP; Random variables;

Optimization; Continuums; **Magnetic resonance imaging**; Energy density ; Elastic anisotropy; Classification
Subj Catg: 17, Instruments and Measurements

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Influence of conductivity tensors on the scalp electrical potential: study with 2-D finite element models

Kim, Sungheon; Kim, Tae-Seong; Zhou, Yongxia; Singh, M

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Abstract:
The influence of conductivity tensor on the forward solution of electroencephalography was assessed in 2-D head models of a human subject. The conductivity tensors of different regions of the head were **estimated** from **magnetic resonance-diffusion tensor** images by linearly mapping the mean trace **values** to the published conductivity **values**. The anisotropic conductivity model was compared with the isotropic conductivity model in terms of the difference between the scalp potentials. The differences were measured by the cross correlation (CC) and the relative error (RE) between two models. We have also proposed a new measure, scaling-removed RE (SRRE) as a more effective indicator of the difference. The results with 354 individual dipole sources show that there are remarkable differences between the anisotropic conductivity tensor and the isotropic model (CC=0.96, RE=30.73% and SRRE=19.34%). Although the CC is high, the large RE and SRRE indicate that this difference may also affect the accuracy of inverse solutions in localizing the current dipole sources.

Descriptors: Mathematical analysis; Tensors; Resistivity; Conductivity; Images; Dipoles; Mathematical models; Anisotropy; Electric potential; Human; Accuracy; Cross correlation; Inverse; Errors; Indicators; Finite element method; Mapping; Error analysis; Electroencephalography
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